WHO SHALL INHERIT LONG LIFE?

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NOVA SCOTIA

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On the Existence of a Natural Process at Work Among Human Beings Tending to Improve the Vigor and Vitality of Succeeding Generations

By Dr. Alexander Graham Bell

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MOST people die before reaching middle life, and comparatively few live to be old.

This has always been so from the very earliest times; and, in spite of modern sanitation and the advance of medical science, remains true today. Only a small proportion of each generation survives the traditional Biblical age of threescore years and ten.

Under these circumstances is it not remarkable that so many people should have parents who lived to be old? Seventy is by no means an unusual age for a parent. Examine the history of the people you know and you will find that very few of them had parents who died before seventy, while a considerable proportion had parents who lived to be eighty or even much older.

An examination of several hundred cases, noted in the Genealogy of the Hyde family[1], shows that 18.7 per cent of these persons lived to be seventy or older; but 81.7 per cent had fathers or mothers who lived beyond seventy. About 13 per cent lived to seventy-five; but 65 per cent, or nearly two-thirds of the whole, had fathers or mothers who lived beyond seventy-five.

The contrast is still more marked when we consider persons who lived to extreme old age. Only 8.7 per cent lived to be eighty or older; and yet 48.1 per cent, nearly one-half of the whole, had fathers or mothers who lived to be eighty or older.

These are the results of an investigation of 1,594 cases in which the ages at death of the persons and of their fathers and mothers were all known.[2]

Such results seem to point to the general conclusion that *a very large proportion of each generation has sprung from a very small proportion of the preceding generation, namely, from the people who lived to be old.*

Another inference is that the long-lived people left more descendants behind them in proportion to their numbers than the others, and therefore, on the average, had larger families.

Of course, many widowers may have married again when they were well advanced in years and have had families by each marriage, but this explanation does not apply to women.

MOTHERS' AGES AN INDEX TO THE SIZE OF THEIR FAMILIES

We cannot, for example, suppose that mothers who died at fifty would have had more children had they lived to be sixty or eighty or a hundred; and yet investigation shows that the mothers who lived to extreme old age actually had, on the average, larger families than those who died earlier in life.

From the Hyde statistics we find that mothers who died before forty had, on the average, only 3.4 children apiece; and this is intelligible because many of the mothers passed away long before the conclusion of the reproductive period, and

[1] Genealogy of the Hyde Family, by Reuben H. Walworth, LL. D., 1864; a work relating to the descendants of William Hyde, one of the early settlers of Norwich, Conn., who died in 1681.

[2] See "The Duration of Life and Conditions Associated with Longevity, A Study of the Hyde Genealogy," by Alexander Graham Bell; published by the Genealogical Record Office, 1601 35th Street, Washington, D. C. $1.00.

Photograph by Gilbert Grosvenor

NINE SONS HAVE BEEN CONTRIBUTED TO THE WORLD'S POPULATION BY MR. AND MRS. MORRISON, OF ST. ANN'S, CAPE BRETON, NOVA SCOTIA

"The persons whose parents both died before sixty lived, on the average, 32.8 years (the Hyde Genealogy). Those whose parents both lived beyond eighty averaged 52.7 years; and where the parents died at the intermediate age periods the duration of life was intermediate."

A NEW YORK STATE FAMILY OF SIXTEEN

It is the pride of Horseheads, N. Y., that Mr. and Mrs. Oliver D. Eisenhart have fourteen children ranging from one to twenty-four years of age. Thirteen are shown in the picture, which was taken before the eldest son went to France, more than two years ago, as a member of the American Ambulance Corps.

Photograph by Corey, supplied by Louise Lacey, Secretary of the Genealogical Record Office

ELISHA CLARK PECKHAM, AGED 92, MIDDLETOWN, R. I., WITH MRS. PECKHAM AND THEIR ELEVEN CHILDREN. ONE CHILD DIED AT THE AGE OF TEN YEARS

The children of long-lived parents are, on the average, stronger, more vigorous, and longer-lived than the children of others, and there are more of them per family.

THE CENTENARIAN CLUB OF LOS ANGELES, CALIFORNIA, WHOSE MOTTO IS, "LIVE A HUNDRED YEARS AND GROW OLD GRACEFULLY"

Left to right, standing: Dr. J. M. Morrison, Vice-President, 97; Rev. H. Judd, 91; Rev. N. A. Millerd, 90; A. A. Annas, 96; Dr. H. L. Canfield, 90; C. R. Post, 92; J. H. F. Jarchow, 92; Senator C. C. Cole, 94. Left to right, sitting: Dr. A. M. Sherman, 92; Dr. J. M. Peebles, 96; S. Selleck, 94; Dr. E. C. Prugh, 95; Mrs. M. K. Bartlett, 92; Mrs. J. F. Howard, 92; Mrs. M. Offenbach, 90; Mrs. Stevens, 94; Rev. S. H. Taft, President, 92. Mrs. Taft in rear.

Photograph by L. H. Bellin

HE HAS SEEN MORE THAN A CENTURY OF WORLD CHANGES

John O'Reilly, born in Ireland, was 101 years of age when this photograph was taken. His father died at 45, but his mother lived to be 90. He was the youngest of eight children. His wife lived to be 84. The fact that more than a hundred years had passed over him had not prevented Mr. O'Reilly from planting his truck garden each spring or caused him to retire from the management of his grocery business.

Photograph supplied by Louise Lacey, Secretary of the Genealogical Record Office

MRS. LOUISA K. THIERS ON HER 104TH BIRTHDAY

The few who live to extreme old age are people who have proved themselves to be immune, or at least resistant, to the diseases that have carried off the vast majority of their fellows. Mrs. Thiers, who lives with her daughter, Mrs. Charles Quarles, in Kenosha, Wis., is in excellent health today. Her eyesight is good and she is alert mentally, following closely the news of the day. She was born October 2, 1814.

might have had more children had they lived longer.

Mothers who died between forty and sixty had 6.2 children apiece, and we would naturally expect that no further increase in the size of the family would be found in the case of mothers who died at later ages. But, as a matter of fact, the mothers who died between sixty and eighty averaged 6.6 children apiece, and the mothers who lived beyond eighty had average families of 7.2 children.[1]

When we remember that in all these cases the children were born before the mothers had passed middle life, it becomes obvious that the mothers who reached old age were *inherently* more fertile than the others. There is thus some correlation between longevity and fecundity. The parents who lived the longest had the most children, on the average.

Photograph by Charles Martin

THE OLDEST HUMAN BEING OF WHOSE BIRTH WE HAVE AUTHENTIC RECORD

Mrs. Ann Pouder, of Baltimore, Md., photographed on her 110th birthday, in the summer of 1917. She died a few months later.

But how about the children? Did they, too, live longer than the others? Yes, upon the average, they did.

The average duration of life of the 1,594 persons referred to above was 40.6 years. Their fathers, on the average, lived 70.9 years, and their mothers 66.0 years. Thus the fathers and mothers, on the average, lived longer than their children. This is always found to be the case when we deal with large numbers; and the reason is very obvious; for, of course, no fathers or mothers died in infancy or childhood, whereas many of the children died young.

[1] See "The Duration of Life," etc., by Alexander Graham Bell. Table 17, relating to 671 fertile marriages of females resulting in the production of 4,022 children, or 6.0 children per marriage.

LONGEVITY IS AN INHERITABLE CHARACTERISTIC

Investigation shows that a larger proportion of the children of long-lived parents lived to be old and a smaller proportion died young than in the case of the others.

The Hyde statistics afford conclusive

evidence that a tendency to longevity is an inheritable characteristic. For example, divide the 1,594 cases into three groups:

1. Those whose parents, neither of them, lived to be eighty.

2. Those having one parent who lived to be eighty or older, and

3. Those having parents both of whom lived to be eighty or older.

Now note the proportion of long-lived persons in each group. Only about 5 per cent of the persons in group one lived to be eighty; about 10 per cent of the persons in group two, and 20 per cent in group three (exact percentages 5.3, 9.8. and 20.6). Few of the persons who did not have long-lived parents behind them lived to be old. The long-lived proportion was practically doubled where one parent lived to be old and quadrupled where both parents lived to be old. The evidence indicates that heredity is deeply involved in the production of longevity.

If we divide the 1,594 cases into groups arranged according to the ages reached by the parents, and then calculate the average duration of life of all the persons in each group, not simply the proportion who lived to be old, we find that the persons constituting the longest-lived group were the offspring of the longest-lived parents, the members of the shortest-lived group came from the shortest-lived parents, with intermediates intermediate.

Number of Cases

Mother's age at death

Father's age at death	−60	60-80	80+
80+	131	206	184
60-80	251	328	172
−60	128	120	74

Average Duration of Life

Mother's age at death

Father's age at death	−60	60-80	80+
80+	42.3	45.5	52.7
60-80	35.8	38.0	45.0
−60	32.8	33.4	36.3

The persons whose parents both died before sixty lived, on the average, 32.8 years. Those whose parents both lived beyond eighty averaged 52.7 years; and where the parents died at the intermediate age periods the duration of life was intermediate.

The figures indicate very clearly that there is a correlation between the duration of life of the individual and the duration of life of his parents; and, conversely, we may conclude that the longest-lived parents, on the average, had the longest-lived children; the shortest-lived parents the shortest-lived children; with intermediates intermediate.

We have only to glance around us at the different forms of animal life to find plentiful indications that the duration of life is influenced, and indeed controlled, by heredity. Each species has its own limit of life, and man is no exception.

The contrasts are often very great: For example, a horse born the same day as a child, dies of old age before the child has reached full maturity. Just think of the differences. The horse may become a parent when the child is only a toddling three-year-old, a grandparent by the time the child is six, and several generations of horses may appear before the child has even reached marriageable age.

The duration of life of each species is controlled and limited by heredity, and heredity even establishes different limits for groups of animals within the same species. The long-lived tend to produce long-lived offspring, the short-lived, short-lived offspring, etc.

A million people may be born on the same day, and we know that multitudes of them will die during the very first year of life. So great is the mortality during infancy and childhood that we may be perfectly certain that the majority of the

Photograph by W. T. Oxley, from the Collections of the Genealogical Record Office

FIVE GENERATIONS OF WOMEN IN A MINNESOTA HOUSEHOLD

Mrs. Karl Melden was 89; her daughter, Mrs. Anne Kastell, 61; granddaughter, Mrs. Hannah Gustafson, 41; great-granddaughter, Mrs. Ann Bergernt, 21; and great-great-granddaughter, Mary Valdine, aged 7 months, when this photograph was taken. Note the remarkable inheritance in similarity of the eyes, even in the baby.

people will have passed away long before the lapse of fifty years. The extreme limit of human life probably does not extend very far beyond the hundred-year mark, and only very few live to be even eighty or ninety.

The few who live to extreme old age are people who have proved themselves to be immune, or at least resistant, to the diseases that have carried off the vast majority of their fellows. They have been exposed to all the diseases and accidents of life and have not succumbed. They have proved themselves to be resistant, not to a single disease alone, but to all diseases; and the fact that they

NO. 1. THE REMARKABLE MC MURRAY FAMILY: FOUR SUCCESSIVE FIVE-GENERATION GROUPS

This photograph, taken 28 years ago, shows Mrs. Lavinia McMurray, aged 83; her daughter, Mrs. J. B. Gregory, aged 63; her granddaughter, Mrs. Martha Violett, aged 43; her great-granddaughter, Mrs. A. J. Wood, aged 23; and her great-great-granddaughter, Veda Wood, aged 3 (see also page 513).

NO. 2. ONE FAMILY OF MRS. MC MURRAY'S DIRECT DESCENDANTS 22 YEARS LATER

Mrs. J. B. Gregory of the first picture is now a great-great-grandmother at 85. Her daughter, Mrs. Martha Violett, is a great-grandmother at 65; Mrs. A. J. Wood at 45 is a grandmother; and Veda Wood (now Mrs. Wesley Sibole), the mother of Ruth Sibole, aged 8 months.

NO. 3. ANOTHER GROUP OF THE MC MURRAY FAMILY

Mrs. McMurray, aged 85; her eldest son, Robert, aged 62; her son's daughter, Mrs. Lavinia Merkle, aged 40; Mrs. Merkle's daughter, Mrs. Annie Stevens, aged 23; and little Gladys Stevens, Mrs. McMurray's great-great-granddaughter, aged 4.

NO. 4. THE MC MURRAYS OF THE MALE LINE 19 YEARS LATER

Robert McMurray has become a great-great-grandfather, aged 81; his daughter, Mrs. Merkle, is a great-grandmother; her daughter, Mrs. Stevens, a grandmother at 42; and Gladys Stevens, of No. 3, is now Mrs. Poe, the mother of two children.

Mrs. Lavinia McMurray was the first of nine children. Her three youngest sisters all lived to celebrate their golden weddings. Her husband died at the age of 81. They had 11 children; four died in infancy and four at the following ages: 24 (M. Gregory), 84, 76, and 72. Three are still living, their ages being 70, 72, and 89. At the time of Mrs. McMurray's death, there were living three children, 43 grandchildren, 55 great-grandchildren, and six great-great-grandchildren—107 living descendants at the time of her death.

transmit to their offspring a tendency to live long shows that the disease-resistant quality is handed down to their descendants.

Of course, longevity itself is not a thing that is capable of direct inheritance; but the fact that longevity seems to run in families shows that a *tendency* to long life can be inherited. It is not longevity itself that is transmitted, but something else that tends to produce long life. What is really inherited is probably a tough, wiry constitution, which enables the fortunate possessor to survive the multitudinous ills that flesh is heir to and live on to the extreme limit of human life. From this point of view, the attainment of old age is extremely significant.

The people who live to be old represent the *disease-resistant* strain of their generation; and, on account of their superior fecundity, this disease-resistant quality is distributed very largely through the population. The weak and delicate do not, as a rule, live very long; nor are they capable of bearing large families. It is the strong and vigorous who live to extreme old age and leave many descendants behind them.

The children of long-lived parents are, on the average, stronger, more vigorous, and longer-lived than the children of others; *and there are more of them per family*.

Here, then, we have evidence of the existence of a natural process at work among human beings tending to improve the vigor and vitality of succeeding generations.[1]

[1] The Genealogical Record Office, Alexander Graham Bell, Director, 1601 35th Street, Washington, D. C., will be glad to receive information concerning all authentic cases of persons now living who are more than 90 years of age. The data should include the date of birth of the individual, the age at which his or her parents died, and the number of children and ages of his or her children and direct descendants.

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